



Standard Test Method for Low-Temperature Flexibility of Preformed Tape Sealants¹

This standard is issued under the fixed designation C765; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a laboratory procedure for testing the low-temperature flexibility of preformed tape sealants.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

C717 Terminology of Building Seals and Sealants

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Terminology

3.1 *Definitions*—The definitions of the following terms used in this test method are found in Terminology **C717**: preformed tape sealant, sealant.

4. Summary of Test Method

4.1 The preformed tape sealant to be tested is applied to an aluminum panel. The assembly is heat aged, then placed in the freezer where the panel is quickly bent over a mandrel. The specimen is examined for cracking and loss of adhesion.

5. Significance and Use

5.1 Preformed tape sealants are tacky, deformable solids that are used under compression between two substrates in a variety of sealing applications. This procedure is not intended

to simulate an actual use condition, but it will give some indication of the flexibility and adhesion of a tape at low temperature. It can serve to differentiate between flexible tapes that can take some movement and those that tend to harden or embrittle on aging and crack or lose adhesion when flexed at low temperature. It will also aid in identifying sealants that have poor flexibility because they are overextended and contain a low level of binder as well as those sealants having binders that will embrittle at low temperature.

6. Apparatus

6.1 *Freezer Unit*, capable of maintaining a temperature of $-23 \pm 2^{\circ}\text{C}$ ($-10 \pm 3.6^{\circ}\text{F}$).

6.2 *Aluminum Panel* (unpolished), approximately 0.635 mm (0.025 in.) thick, 76 mm (3 in.) wide, and 152 mm (6 in.) long.

6.3 *Steel Mandrel*, 25.4 mm (1 in.) in diameter, with supporting holder or rack.

6.4 *Vented Air Circulating Oven*, that complies with Specification **E145** and is capable of maintaining a temperature of $70 \pm 2^{\circ}\text{C}$ ($158 \pm 3.6^{\circ}\text{F}$).

7. Sampling

7.1 Samples to be tested shall be taken from a fresh roll of tape sealant after first removing and discarding approximately the first 0.61 m (2 ft) of the roll.

8. Test Specimen

8.1 Prepare the test specimen as follows:

8.1.1 Clean the 76-mm by 152-mm (3-in. by 6-in.) aluminum panel with methyl ethyl ketone or similar solvent.

8.1.2 Place a 102-mm (4-in.) length of tape in the center of the panel with its length paralleling that of the panel, leaving the release paper in place on the preformed tape sealant.

8.1.3 Apply light finger pressure to ensure intimate contact of the preformed tape sealant with the panel.

8.1.4 Remove the release paper from the test specimen.

9. Conditioning

9.1 Place the specimen in a horizontal position in a forced-draft oven and condition for 14 days at $70 \pm 2^{\circ}\text{C}$ ($158 \pm 3.6^{\circ}\text{F}$).

¹ This test method is under the jurisdiction of ASTM Committee **C24** on Building Seals and Sealants and is the direct responsibility of Subcommittee **C24.20** on General Test Methods.

Current edition approved June 1, 2015. Published July 2015. Originally approved in 1973. Last previous edition approved in 2011 as C765–97(2011). DOI: 10.1520/C0765-97R15.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

9.2 Remove the test specimen from the oven and immediately place it in a horizontal position in a freezer unit maintained at $-23 \pm 2^{\circ}\text{C}$ ($-10 \pm 3.6^{\circ}\text{F}$) for 4 h.

9.3 Condition the steel mandrel with its holder or rack in the freezer in the same manner.

10. Procedure

10.1 After the specimen and mandrel have been conditioned for 4 h and while they are still in the freezer at $-23 \pm 2^{\circ}\text{C}$ ($-10 \pm 3.6^{\circ}\text{F}$), bend the test specimen 180° around the mandrel, with the aluminum panel next to the mandrel, using no more than 2 s to make the bend.

10.2 Visually examine the specimen for cracking or loss of adhesion of tape to panel, or both, and estimate the area of such adhesion loss to the nearest 64.5 mm^2 (0.1 in.^2).

11. Report

11.1 Report the following information:

11.1.1 Identification of the preformed tape sealant, that is, the name, lot number, and any other identifying characteristics.

11.1.2 Amount of adhesion loss on the specimen in terms of percentage of the total tape area.

11.1.3 Description of any cracking. Indicate the degree, depth, extent, and location of cracks.

12. Precision and Bias

12.1 No statement can be made on the repeatability and reproducibility of the procedure in this test method for rating adhesion loss and cracking because all four laboratories testing three materials obtained the same result, none, for all samples tested.

13. Keywords

13.1 flexibility; low-temperature flexibility; preformed tape sealants; tape sealants; tapes

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